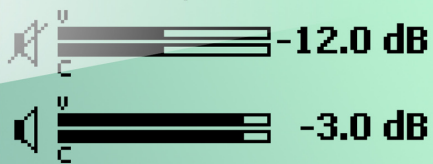


- INPUT
- MODE
- CLIP
- **SIGNAL**
-
- CLIP
- **SIGNAL**
- DSP
- **uman**

MENU

ENTER

3.1 Signal Monitor



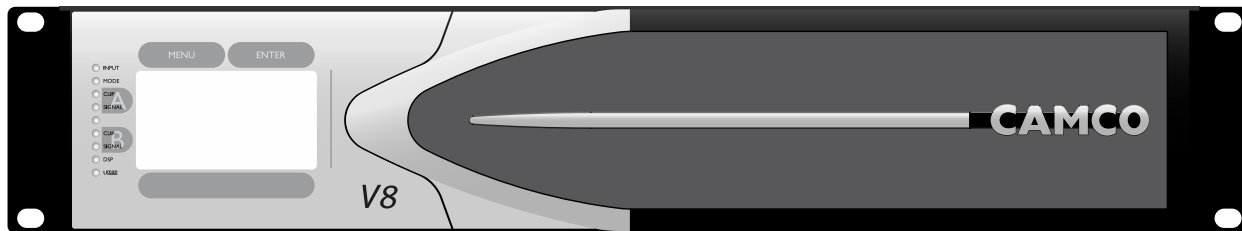
V8



CAMCO

VORTEX
SILVER SERIES

V8 USER MANUAL



**INFORMATION FOR USE FOR MODELS
VORTEX SILVER SERIES V8**

SSUM_GB_2010-R1_11-2010

The leading version of this brochure is the English one which shall prevail to the exclusion of the national translation on hand.

Copyright 2010 by **CAMCO** Produktions- und Vertriebs-GmbH
für Beschallungs- und Beleuchtungsanlagen
Fischpicke 5, D-57482 Wenden, Germany
Telephone +49 (0) 2762 408-0

VORTEX
SILVER SERIES

Please visit our website www.camcoaudio.com for the latest version of this user manual. Please note that the leading version of CAMCO manuals is always the English one.

IMPORTANT SAFETY INSTRUCTIONS

1. General

The amplifier may only be used in accordance with the information provided in the user manual. Before and during the usage of the amplifier please ensure that all recommendations, especially the safety recommendations as detailed in the user manual, are adhered to.

The **VORTEX SILVER SERIES V8** amplifier is designed for the amplification of pulsed audio signals. The amplifier should only be connected to speakers with an average impedance as indicated.

2. User Manual

Read the information for use (user manual) and heed all warnings. Keep this user manual in a safe place during the lifetime of the amplifier. The user manual forms an integral part of the amplifier. Reselling the amplifier is only possible if the user manual is available. In case of reselling the amplifier, the reseller has to document any changes made to the amplifier in writing and pass the documentation on to the buyer.

3. Environments

Use this amplifier only in E1, E2, E3, or E4 environments according to EN55103-2 "Electromagnetic compatibility – Product family standard for audio, video, and audio-visual and entertainment lighting control apparatus for professional use – Part 2: Immunity".

4. Mounting/Placement

Do not place this amplifier on an unstable cart, stand, tripod, bracket, or table. The amplifier may fall causing serious injury and serious damage to the product. Any mounting of the amplifier should follow the manufacturer's instructions. Only mounting accessory shall be used which is recommended by the manufacturer.



5. Power Cord Protection

Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon them or against them, paying particular attention to cords and plugs and the point where they exit from the amplifier.

6. Heat

Do not use this amplifier near any heat sources such as radiators, heat registers, stoves, or other apparatuses that produce heat.

7. Water and Moisture

Do not expose this device to rain or moisture. Do not use this amplifier near water (for example swimming pools and fountains). Do not place any objects containing liquids, such as bottles or glasses, on the top of the unit. Do not splash liquids on the unit. IP-20 equipment. There is no protection against splashing water.

8. Ventilation

Slots and openings in the cabinet are provided for ventilation to ensure reliable operation of the amplifier and to protect it from overheating. These openings must not be blocked or covered. This amplifier should not be installed unless proper ventilation is provided or manufacturer's instructions have been adhered to.

9. Interference Of External Objects and/or Liquids with the Appliance

Never push objects of any kind into this amplifier through openings as they may touch dangerous voltage points or short-out parts that could result in fire or electric shock. Never spill liquid of any kind on the amplifier.



10. Connections

When you connect the amplifier to other equipment, turn off the power and unplug all of the equipment from the supply source. Failure to do so may cause an electric shock and serious personal injury. Read the user manual of the other equipment carefully and follow the instructions when making the connections.

11. Lightning

For additional protection of this amplifier during lightning storms or when it is left unattended and/or unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the amplifier due to lightning and power line surges. Disconnection from the mains power supply can only be achieved by removing the plug from the mains socket and by external disconnecting all poles from the mains.

12. Damages that Require Service

Unplug this amplifier from the mains supply and refer to your dealer/distributor or other authorized repair workshop if any of the following situations occur:

- if liquid has been spilled or objects have fallen into the amplifier
- if the amplifier has been exposed to rain or moisture
- if the amplifier has been dropped or damaged in any other way
- if the power supply cord or plug has been damaged
- when the amplifier exhibits a distinct change from its normal function or performance
- in case the amplifier has been used in a dusty environment for quite a period of time

13. Servicing

All service and repair work must be carried out by a dealer/distributor authorized by **CAMCO**. Do not attempt to service this amplifier yourself. As opening or removing covers may expose you to dangerous voltage or other hazards, the amplifier may only be opened by qualified personnel. Please refer to your dealer/distributor.

14. Spare Parts

When spare parts are required, please ensure that the dealer/distributor only uses spare parts specified by the manufacturer. The use of unauthorized spare parts may result in injury and/or damage through fire or electric shock or other electricity-related hazards.

15. Safety Check

Upon completion of any service or repairs to this product, ask the dealer/distributor to perform safety checks to determine that the amplifier works properly.


Recommendations on how to carry out the safety test can be found in DIN VDE 0701-1 "Maintenance, Modification and Test of Electronic Appliances".

16. Cleaning

Unplug this amplifier from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Clean only with dry cloth.

17. Packaging and Shipping


When shipping the **VORTEX SILVER SERIES V8** amplifier, always use the original shipping carton and packing materials. For maximum protection repack the unit as it was originally packed at the factory.



CAUTION
 RISK OF ELECTRIC SHOCK
 DO NOT OPEN



CAUTION – HIGH VOLTAGE HAZARDS
 EXIST WITHIN THIS PRODUCT.
 REFER ALL SERVICING TO
 AUTHORIZED PERSONNEL.



THE LIGHTNING FLASH WITH ARROW HEAD SYMBOL IS INTENDED TO
 ALERT THE USER TO THE PRESENCE OF UNINSULATED DANGEROUS
 VOLTAGE WITHIN THE PRODUCT'S ENCLOSURE.



THE EXCLAMATION MARK IS INTENDED TO ALERT THE USER
 TO IMPORTANT INSTRUCTIONS ALSO FOR MAINTENANCE IN THE
 LITERATURE ACCOMPANYING THE AMPLIFIER.



THE LIGHTNING FLASH WITH ARROW HEAD SYMBOL ALERTS
 THE USER TO DANGEROUSLY HIGH VOLTAGE AT
 THE OUTPUT CONNECTORS

CAUTION – RISK OF ELECTRIC SHOCK – DO NOT OPEN.

WARNING – TO PREVENT FIRE OR SHOCK HAZARD, DO NOT
 EXPOSE THIS AMPLIFIER TO RAIN OR MOISTURE.



THE AMPLIFIER MAY ONLY BE CONNECTED
 TO A SOCKET WITH A PROTECTIVE EARTH CONDUCTOR.



EC Declaration Of Conformity In Accordance To EC Directives:

electromagnetic compatibility (Council Directive 89/336/EEC,
as amended by Directives 92/31/EEC and 93/68/EEC);
low-voltage electrical equipment (Council Directive 73/23/EEC)

Manufacturer's Name:

CAMCO Produktions- und Vertriebs-GmbH
für Beschallungs- und Beleuchtungsanlagen

Manufacturer's Address:

Fischpicke 5, D-57482 Wenden, Germany

Declares That The Product With The Model Name:

CAMCO Power amplifier **VORTEX SILVER SERIES V8**

Conforms To The Following Standards:

- EN60065 Safety
- EN55103-1 Emission
- EN55103-2 Immunity

The operating conditions and application environments presupposed in
the information for use (user manual) are to be kept to accordingly.

Please Note: The following formulations have been chosen: **VORTEX-V8** for
the type plate and for the EC declaration of conformity. **V8** for the front face
of the appliance and for the text in the user manual.

Wenden, 20.05.2010



Joachim Stöcker



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P. 5	EC DECLARATION OF CONFORMITY		4.5.2 Output Mode
P. 6	CONTENTS		4.6 Amp Gain and Input Sensitivity
P. 7	1 WELCOME		4.7 DSP
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	4.3.7 Uman Network Status LED		AMPLIFIER
P. 17	4.4 Main Menu		



1.1 Welcome To CAMCO

Established in 1983, **CAMCO** has gained worldwide experience with professional sound reinforcement technology. Within the audio market, **CAMCO** specialises in the production and marketing of high quality power amplifiers and sound systems to be used both on tour and in static installations.

The success of the **LA**, **DL**, **DX**, and **TECTON** series power amps has made the name **CAMCO** synonymous with professional quality, high performance, and utterly reliable power amps.

With the **VORTEX** power amp series, **CAMCO** has been pioneering a new dimension in professional power amp construction in the last decade. The seamless combination of ground-breaking technology with proven safety elements has been the hallmark of the **VORTEX** series.

CAMCO's commitment to research and development, seen not just in the area of materials and technology but also most importantly in its highly skilled and motivated workforce, is one of the keys to its ongoing success.

The new technologies that have been developed and applied to the pro-audio industry have been substantial over the last few years, but actually it is only now that we as designers, researchers, and developers are able to take the next steps in building a more coherent future with tools that really integrate together.

The ancient cultures developed an understanding of our world by a realisation of the individual elements that are at the core of all things. These were described as the Five Elements. We see the development of technology and the resulting products in the same way. Today **CAMCO** follows the same pattern of realisation, our five elements are ; Efficiency, Power, Networking, Signal Processing, and Design.

As the five elements come together to form the One, we can see that the evolution of amplifiers is now reaching the point where we can truly call the amplifier a universal audio platform, not just X-amount of power output, as impressive as it is in terms of true power per channel across the **V8**, but a Network station, an advanced Signal Processing station, a multicore like distribution centre, too, allowing hundreds of channels of processing and data to be sent and received which all can be controlled from one platform.

Thus the efficiency of the complete package now shows itself to be much more than just a power amplifier. The **CAMCO VORTEX SILVER SERIES V8** is evolving into much more; it is in fact becoming the evolution of today's pro-audio needs and conditions. It will be the bench mark for building the future.

Welcome to the new world of professional power amplifiers –

WELCOME TO CAMCO!

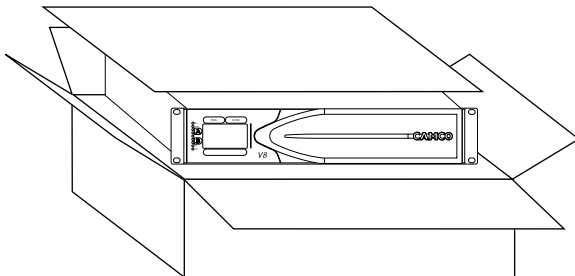
2.1 Unpacking

Please unpack and inspect your new amplifier for any damage that may have occurred during transit. If damage is found, notify the transportation company immediately. Only you as the consignee may initiate a claim for shipping damage. **CAMCO** will be happy to cooperate fully as needed. Please save the shipping carton as evidence of damage for the shipper's inspection.

Even if the amplifier has arrived in perfect condition, save all packing materials for any future transport of the unit.

When shipping the **V8** amplifier, always use the original shipping carton and packing materials. For maximum protection, repack the unit as it was originally packed at the factory.

NOTE: NEVER SHIP THE AMPLIFIER WITHOUT THE ORIGINAL PACKING MATERIALS.



2.2 The Amplifier

The **V8** amplifiers offer a power output of:

4400 W peak per channel @ 4 Ω (3800 W rms)
 4400 W peak per channel @ 2 Ω (4000 W rms)
 8800 W peak in Mono Bridge @ 4 Ω (7600 W rms)
 8800 W peak in Parallel Mono @ 2 Ω (8000 W rms)

using a bipolar class H high efficiency power amplifier output stage.

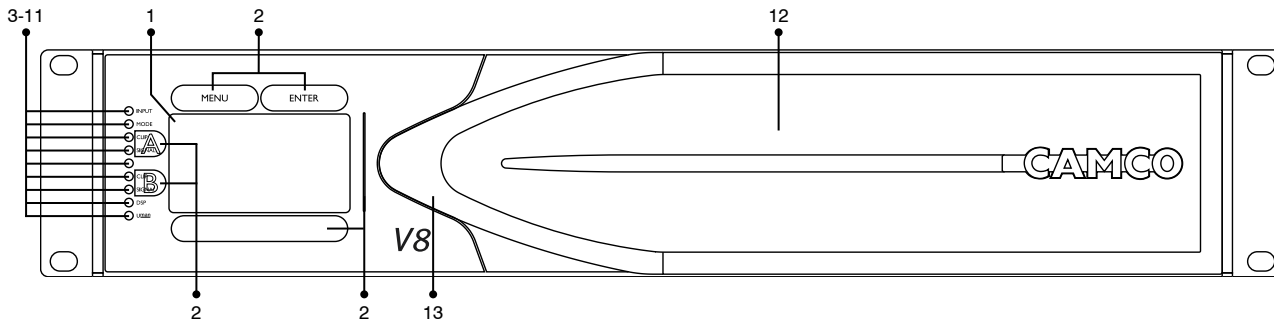
The **V8** power amplifier is fitted with Dual Voltage Switched Mode Power Supply (SMPS) with automatic voltage selection for 120V / 230 V operation, which significantly reduces the weight and size (only 2U) of the amplifier. Using SMPS, the seamlessly regulated symmetrical supply voltages of the power amplifier are more stable and efficient than the power supplies used in conventional amplifiers.

The **V8** also uses a microprocessor for controlling and monitoring the power amp. This has four main advantages over more traditional power amp systems:

- Reduced Distortion
- Improved Noise Characteristics
- Integrated Remote Control
- Indication of Protection or Failures

The **V8** has been designed as an intelligent and powerful amplifier for performing specialised tasks within a complex audio system. Users can adapt the power amp to meet their specific audio requirements before use. The display mounted on the front of the **V8** amplifier allow the different functions to be accessed. Since there are a lot of parameters available, it is important that users should familiarize themselves thoroughly with the entire range of settings and programmable features before using the power amp.

If you have any questions regarding features and/or functions of your **V8** amplifier, **CAMCO** will be pleased to provide you with further information. Alternatively, contact your dealer or distributor.

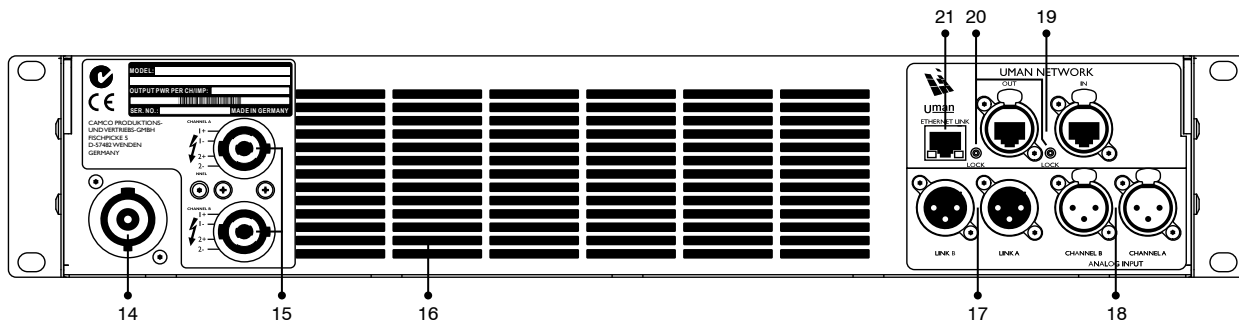


2.3 V8 - The Front

- 1 Display
- 2 Touch Controls
- 3 Input Selection LED
- 4 Output Mode LED
- 5 Clip LED Channel A
- 6 Signal LED Channel A
- 7 Device Indicator LED
- 8 Clip LED Channel B
- 9 Signal LED Channel B
- 10 DSP LED
- 11 Uman Network Status LED
- 12 Cooling Air Inlet Vents
- 13 Removable Air Filter System

2.4 V8 - The Rear

- 14 AC Power Connector
- 15 SPEAKON Connectors
- 16 Cooling Air Outlet Vents
- 17 XLR - Line Links
- 18 XLR - Line Inputs
- 19 Uman Network Connectors
- 20 Uman Network Link LED
- 21 Ethernet Connector for remote access





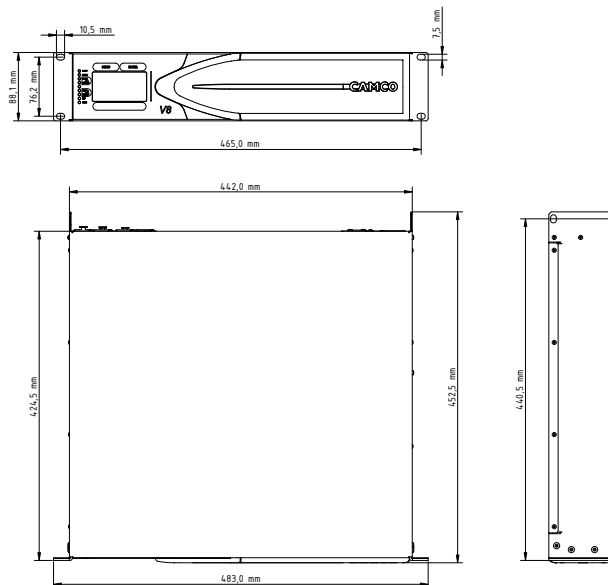
2.5 Factory settings

V8 amplifiers are delivered with the following factory settings

Power Status	Amplifier is switched Off
Mute	Both channels active
Input Selection	Analog
Level Attenuator	0 dB both channels
Clip Limiter	Off
Output Mode	Dual Channel
AmpGain	26 dB
IP Settings	192.168.1.1
IP Mask	255.255.255.0
IP Gateway	192.168.1.1
DSP	Off
Display Brightness	75%
Lock Device	Unlocked

3.1 Mounting

Use four screws and washers when mounting the amplifier to the front rack rails. For mobile use, the amplifier should also be secured using the 19" mounting elements on the rear panel.



3.2 Cooling

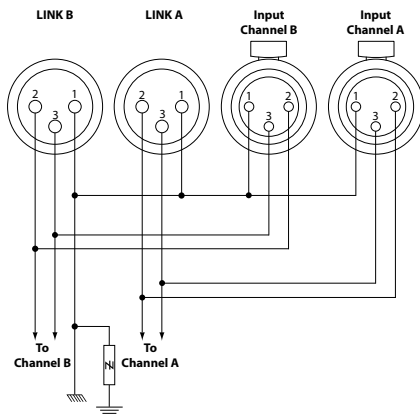
Under normal operation of the power amp, overheating should never be a problem. The air is taken in from the front and out through the back. It is of course essential that while the power amp is running, air is able to circulate around it freely. The efficiency of the cooling will depend on both the immediate environment (e.g. an enclosed rack, direct sunlight) and that the front filter is clogged. If the amp is installed in a case, the open area at the back of the case must be at least 140 cm². This area should be in line with the amp. If this cannot be achieved, a forced ventilation system has to be used.

3.3 Wiring

3.3.1 Analog Input - XLR Connection

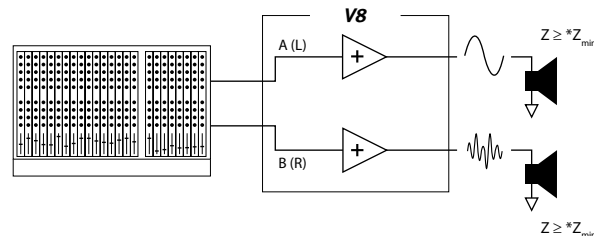
XLR:
Pin 1 = Ground (or lifted via 15 Ω resistor)
Pin 2 = Hot (in-phase)
Pin 3 = Cold (out of phase)

Always use symmetrically (balanced) shielded cable to connect the amplifier.



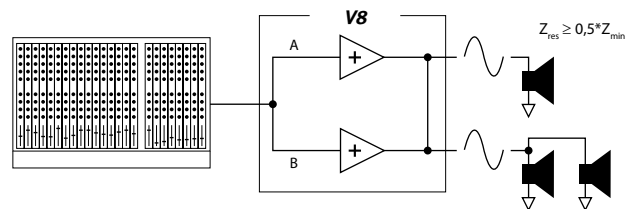
3.3.2 Dual Channel Operation

Two fully independent amplifier channels (normal operating mode).



3.3.3 Parallel Mono Operation

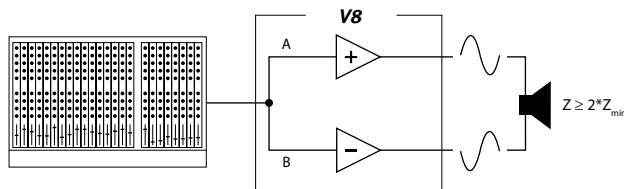
Parallel operation of the two channels together.



The output terminals of the two channels are configured in parallel using an internal relay. The (single) load is connected either to the output of channel A or to that of channel B (as if in dual channel). While the total output of the amplifier remains the same and the output voltage level is also the same as in dual channel operation, the minimum impedance that can be connected is reduced by half due to the fact that current capability is doubled. Only channel A-Input is active. The channel B-Input is inactive – turn the volume on channel B down to zero. This mode is useful when for example 3 identical loudspeakers are to be operated with the same power.

3.3.4 Mono Bridge Operation

One-channel mono bridged operation.



The second channel processes the same input signal, but with reversed phase. The (single) load is connected between the two positive channel outputs using a suitable connected SPEAKON connector. While the total output of the amplifier remains the same, both the available output voltage and the minimum impedance that can be connected are doubled - like being operated in dual channel operation. Only channel A-Input is active – turn the volume on channel B down to zero.

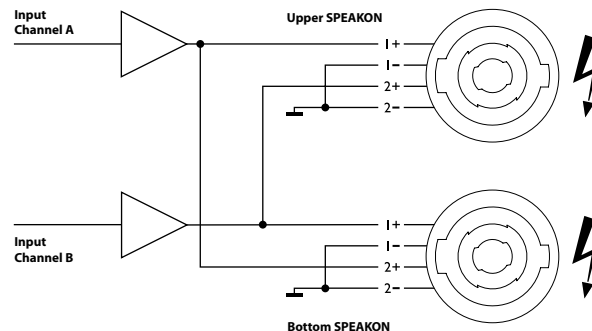
WARNING: In Mono Bridge Operation RMS output voltages are as high as 260 V. Wiring to the speaker loads must conform to NEC Class 3 safety standards or its equivalent that meets all national and local electric codes. All customer specific cables may only be manufactured by qualified suppliers/personnel. All cabling or rewiring work must be carried out by qualified personnel.

*Zmin= 2 Ω for V8

3.3.5 SPEAKON Connection

Both SPEAKON connectors are connected to channel A and channel B outputs. The pin configuration of the SPEAKON connectors is as follows:

Upper SPEAKON:	Pin 1+	Channel A signal
	Pin 1-	Channel A ground
	Pin 2+	Channel B signal
	Pin 2-	Channel B ground
Bottom SPEAKON:	Pin 1+	Channel B signal
	Pin 1-	Channel B ground
	Pin 2+	Channel A signal
	Pin 2-	Channel A ground



WARNING!

SPEAKON connectors marked with the lightning flashes indicate high voltages that are potentially life threatening.

Wiring to these terminals requires installation by an instructed person or the use of ready-made leads or cords.

Custom wiring should only be carried out by qualified personnel.

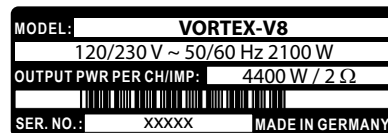
To prevent electric shock, do not operate the amplifier with any of the conductor portion of the speaker wire exposed.

NOTE: For reasons of safety and performance do only use high-quality fully insulated speaker cables of stranded copper wire. Use the largest wire size that is economically and physically practical. Make sure that the cables are not longer than necessary.

IMPORTANT: When connecting speaker cabinets in parallel, always use all the contacts in both **SPEAKON** connectors. If not, this may cause permanent damage to the connectors and considerably reduce performance.

3.4 Mains supply

When mounting or connecting the amp, always disconnect it from mains. Only connect the **V8** amplifier to an appropriate AC circuit and outlet in accordance with the requirements indicated in the second line on the rating plate.



Exemplary rating plates for a mains supply of 120/230 V AC 50/60 Hz.

Power Supply Data:

	Voltage	Mains Frequency	Current	Power Consumption
V8	120/230 V	50/60 Hz	30/15 A	2100 W

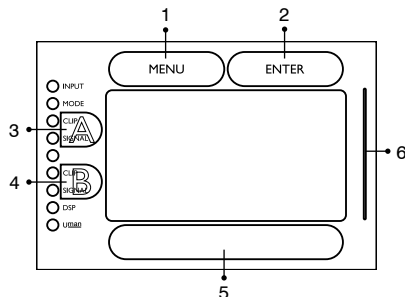
NOTE: Even under normal conditions the mains current can reach levels up to 20 A (230 V), and 40 A (120 V), respectively; this could cause lamps to flicker if connected to the same mains as the amp. The impedance of the AC circuit should be less than 0,157 Ω to avoid flicker according to EN61000-3-11 "Electromagnetic compatibility – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations, and flicker in the public low-voltage supply systems – Equipment with rated current \leq 75 A and subject to conditional connection". If in any doubt, consult your local power provider. Never attempt to measure this impedance level with your Ohmmeter. This may damage your meter and expose you to the risk of electric shock!

4.1 Screen User Interface

Due to the advanced approach with the absence of any control knobs or switches, control of all parameters is done via the screen user interface.

4.1.1 Screen User Interface Elements

The screen user interface consists of four buttons and two selection bars.



1 MENU button (MENU)

- touch to leave the current screen without changes
- Hot key: touch and hold (≈ 2 s) to navigate to the Signal Monitor

2 ENTER button (ENTER)

- navigate to the selected menu item, confirm changes

3 A button (A)

- select channel A

4 B button (B)

- select channel B

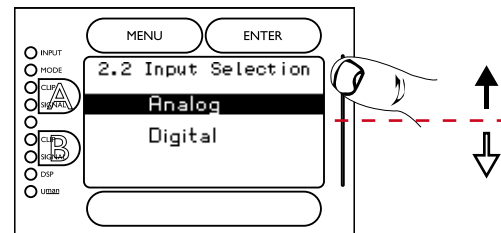
5 Horizontal Selection Bar (HSB)

- increase/decrease values

6 Vertical Selection Bar (VSB)

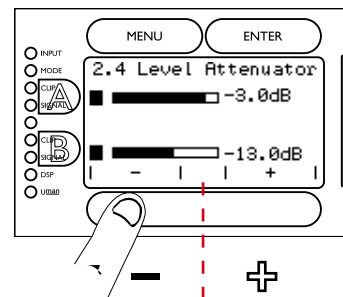
- scrolls through menu items

4.1.2 Handle the Selection Bars



-Tip the VSB at the upper half to scroll upwards.

-Tip the VSB at the lower half to scroll downwards.



-Tip the HSB at the left half to decrease values.

-Tip the HSB at the right half to increase values.

4.1.3 Hot key Functions

The Hot key Functions give you a quick access to important setting screens. The Power Hot key is accessible from all menu levels and screens.

Power Off Hot key:

Touch and hold **MENU** and **ENTER** simultaneously (≈ 3 s). Power Off screen will be displayed. Touching again **MENU** and **ENTER** simultaneously will start Power Off-Sequence.

Level Attenuator Hot key (from monitor screens 3.1-3.4):

Touching the **HSB** opens the Level Attenuator Screen for a quick access to level adjustments. After adjustment you can step back to the previous screen by touching the **MENU** button.

Mute Hot key (from monitor screens 3.2-3.4):

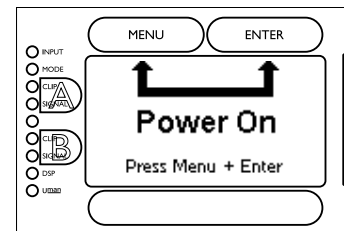
Touching button **A** or button **B** let you directly jump to the Signal Monitor. Here you can mute/unmute each channel directly by touching button **A** or button **B** again. After adjustment you can step back to the previous screen by touching the **MENU** button.

Signal Monitor Hot key

Touch and hold **MENU** (≈ 3 s) let you directly jump to the Signal Monitor. You can step back to the previous screen by touching the **MENU** button.

4.2 Power On-Sequence

As soon as the **V8** amplifier is connected to the mains power supply, it will start the Power On-Sequence. The display will show the **V8** logo followed by the Power On-Screen.



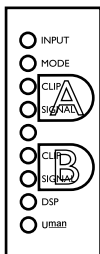
This is the screen used to switch the amplifier on/off. Please touch **MENU** and **ENTER** simultaneously to switch on the amplifier or touch any of the touch-sensitive elements to activate the display backlight.

NOTE: Turning the Amplifier off does NOT disconnect the amplifier from mains.

The switch initiates start-up by activating the current limiting function. As soon as the power amplifier is connected to the mains power supply, a voltage is supplied to both the line-filter and the fused input of the controllable rectifier. Disconnecting the amplifier from the main power supply can only be achieved by physically separating the amplifier from the mains by pulling the mains plug. The mains plug therefore has to be freely accessible. Disconnect the mains plug from the mains during a lightning storm or when the amplifier remains unused or unsupervised for a prolonged period of time. Alternatively, you can disconnect the amplifier from the mains via an external all-pole disconnection.

If a power cut occurs while the amplifier is switched on, it will restart automatically once the power supply has been restored. All settings prior to the loss of power will be maintained.

4.3 Indicators



Input Selection LED
Output Mode LED
Clip LED Channel A
Signal LED Channel A
Device Identifier LED
Clip LED Channel B
Signal LED Channel B
DSP LED
Uman LED

4.3.1 Input Selection LED

The status of the bi-coloured (green/red) LED changes between off, green, and red depending on the selected Input Selection (see 4.5.1).

- | | |
|---------------|--|
| LED is off | - Analog Inputs active |
| LED lit green | - Digital (Uman) inputs active |
| LED lit red | - If Digital with Analog Fallback is selected, the red Input Mode LED indicates that one of the digital inputs have failed and will be replaced by analog backup signal. |

4.3.2 Output Mode LED

The status of the bi-coloured (green/orange) LED changes between off, green, and orange depending on the selected Output Mode (see 3.3 & 4.5.2).

- | | |
|----------------|---------------------------|
| LED is off | - Dual Channel Operation |
| LED lit green | - Mono Bridge Operation |
| LED lit orange | - Parallel Mono Operation |

4.3.3 Clip LED (Channel A/Channel B)

This LED indicates an overloading of the amplifier when the power output level is too high.

4.3.4 Signal LED (Channel A/Channel B)

The green Signal LED is illuminated when the voltage level at the output reaches approx. 4 V; this corresponds to a power of approx. 4 W over a 4 Ω resistor.

4.3.5 Device Identifier LED

This white coloured LED helps you to identify an amplifier in a large Uman network. By activating the Identify Device function in Uman software, the Device Identifier LED of the corresponding amplifier will shine.

4.3.6 DSP LED

The green DSP LED is illuminated when the optional DSP-Board (see www.camcoaudio.com for more information) is installed and routed into the signal path.

4.3.7 Uman LED

The green Uman LED is illuminated when the amplifier is connected to a Uman network.



4.4 Main Menu

To switch the amplifier off use the **Power** menu.

All settings important for operation of the amplifier are accessible in the **Settings** menu.

Information about operating state of the amplifier like Temperature, Output Signal, Configuration Overview, and Network Overview are accessible in the **Monitor** menu.

Adjustments for display brightness and contrast will be done in menu **Display**.

A temporary lock of the touch-sensitive elements to prevent unintentional changes is accessible through the **Lock Device** menu.

The serial number and current firmware version of your **V8** are displayed in the **System Info**.

Please consult the **V8** Navigation Guide for details about the menu. You can always find the current **V8** Navigation Guide on our website camco-audio.com.

4.5 Input/Output

4.5.1 Input Selection

Due to the fact that the **V8** amplifier has a Uman Digital Audio Network Interface which is built-in and ready to use, there are three different Input selections possible:

Analog

In this mode analog signals connected to the XLR Input connectors at the back of the amplifier will be used as input signal.

Digital

With the digital setting input signals are taken from the Uman Digital Audio Network Interface.

Digital with Analog fallback

For normal operation the input signals are taken from the Uman Digital Audio Network Interface. In case of a disconnection or failure of the Digital Audio Network the fallback mode automatically switches over to the analog inputs and gives you an extra portion of redundancy.

4.5.2 Output Mode

There are three different Output Modes available:

Dual Channel Operation

Mono Bridge Operation

Parallel Mono Operation

For more information about Output Modes please see section 3.3.

4.6 Amp Gain and Input Sensitivity

The **V8** amplifier has a 26 dB and 32 dB voltage gain setting along with a 1,4 V sensitivity setting.

The table shows input sensitivity per channel for a given gain and load. It also shows the gain for the 1,4 V input sensitivity.

Model		26 dB	32 dB	1,4 V
V8	4000 W @ 2 Ω	4,48 V	2,24 V	39,8 dB
	3800 W @ 4 Ω	6,18 V	3,10 V	
	2200 W @ 8 Ω	6,65 V	3,33 V	

4.7 DSP

With the optional DSP-Board installed you can route the DSP into the signal chain (DSP On) or bypass the complete DSP section (DSP Off).

For more information regarding DSP functionality and Remote Control of the Amplifier please visit www.camcoaudio.com.

4.8 Power Amp Protection Systems

4.8.1 Clip Limiter

If the power amp is overdriven, the clip detection circuit triggers the microprocessor. The processor reduces the input signal level by controlling the DCA. The strategy is implemented in software. For sinusoidal input signals the microprocessor limits the input signal in such a way that non-linear distortions of the signal never exceed 1 %. The Clip Limiter can work on each channel independently (except in the two mono-operation modes). To disable the Clip Limiter, use 2.5 Clip Limiter Screen.

4.8.2 SOA Protection

To ensure that the power transistors are only used in the Safe Operation Area (SOA), the SOA-protection would mute the corresponding channel. If the power transistors are back in their SOA, the channel is automatically unmuted again.

4.8.3 DC Protection

Each output of the power amp is constantly monitored for persistent DC voltage levels. If the 3 V threshold voltage is exceeded at any of the outputs, the corresponding channel will be automatically switched off. The microprocessor performs a sophisticated strategy to locate the cause of the malfunction. DC can be located in the output stage, driver stage, or at the input of the amplifier.

Output Stage

When a persistent DC voltage is located at an output stage, the main SMPS remains switched off. This will be indicated in the amplifier's display.

Driver Stage

When a DC voltage is located at the driver stage, only the defective channel's output stage and the DCA are muted. The other channel continues to work. This will be indicated in the amplifier's display.

Amplifier Input

When DC is located at the input stage, only the DCA of the affected channel is muted. The other channel continues to operate normally. If the DC signal at the input vanishes, the microprocessor will unmute the affected channel and the amplifier will work as usual again. This will be shortly indicated in the amplifier's display.

4.8.4 DC Servo

To prevent DC Offset at the speaker output, the **V8** amplifiers are fitted with two DC Servos (hence there are no capacitors in the signal path!).

4.8.5 Overcurrent Protection

The output stage is permanently monitored for possible current surges. There are two limiting levels of overcurrent depending on output voltage. These limits will be set automatically. This improves reliability without degrading sound quality when driving complex loads.

4.8.6 Thermal Protection

The microprocessor uses several sensors on the amplifier's heatsinks in order to ascertain temperature data. If the microprocessor detects a temperature of more than 85 °C at the amplifier's heat sinks, the input signal on that channel is automatically reduced. If the temperature exceeds 95 °C, the corresponding channel is muted. If the temperature exceeds approx. 110 °C, the main SMPS is switched off as an emergency protection. The thermal protection status of the amplifiers are indicated in the display.

4.9 Mains Protections

4.9.1 Inrush Current Limitation

Within 2 seconds of the **V8** amplifiers being switched on, the inrush current limiter will increase mains current from nearly zero to nominal value. This value depends on programme material, output level, and speaker loads.

4.9.2 Mains Over Voltage Detection

Mains Over Voltage Detection is always operative. When the mains voltage exceeds approx. 265 V (230 V operation), or 134 V (120 V operation), the amplifier will switch off. When the mains voltage returns to nominal value, a soft start occurs.

4.9.3 Mains Failure Detection

Mains Failure Detection is always operative. When the mains supply is interrupted for about 2 mains cycles, the amplifier will switch off. When the mains voltage returns to a normal value, a soft start occurs.

4.9.4 Fuse Protection

The average mains current can peak temporarily, depending on the load impedance and type of signal, at values several times higher than the nominal value allowed by the fuse protection. Continuous monitoring of the fuse protection status allows the conditions that would trigger the fuse protection to be predicted. In order to avoid shut-down of the amplifier due to current overload, the amplitude of the input signals will be limited. The limitation of the input signal allows the **V8** power amplifier to be operated reliably from a mains power supply of 230 V/15 A (120 V/30 A).

4.10 Main SMPS Protections

4.10.1 Overcurrent Protection

Main SMPS (Switched Mode Power Supply) transformer current of your **V8** amplifier is continuously monitored. If over current occurs, the main SMPS immediately stops working. Should there be an internal failure, this feature prevents other parts being damaged.

4.10.2 Thermal Protection

The temperature of the main SMPS transformer of your **V8** amplifier is permanently monitored. If the temperature exceeds 85 °C, the main SMPS is switched off. The amplifier's display will indicate a main SMPS error in this case.

4.11 Fans

The fans mounted in your **V8** amplifier operate permanently, but as long as the temperature remains below 40 °C, they run at their slowest speed and can hardly be heard. The highest detected temperature from either channel controls the speed of the fans. Above 40 °C the speed is increased until it reaches its maximum value.

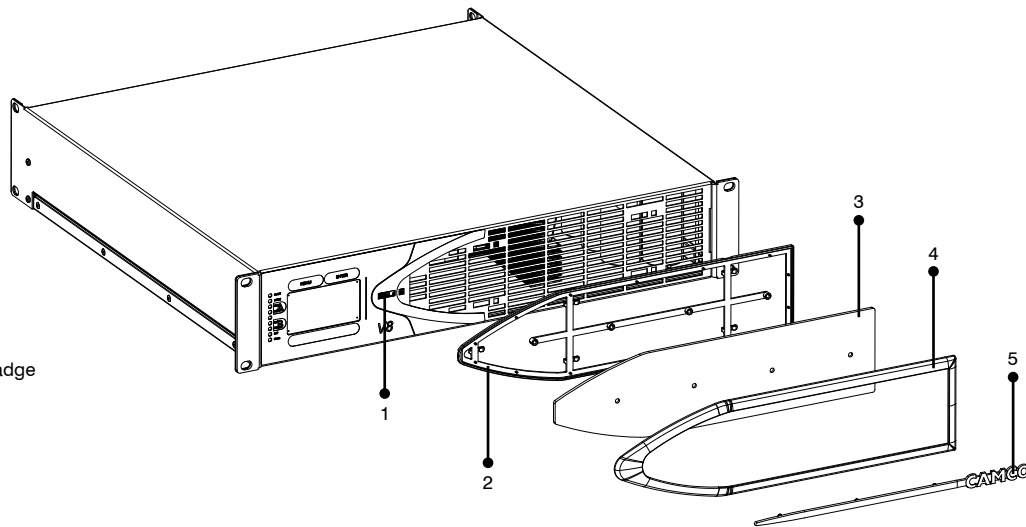
4.12 Filter Cleaning

The air intake on the front of your **V8** amplifier is fitted with a removable filter system. If the filter becomes clogged, the unit will not cool as efficiently as it should and may result in reduced output levels.

For changing the filter, no tools are required: first, gently slide the whole plastic filter assembly a few millimeters to the left and lift it from the front panel. Next, beginning on one of the long sides, carefully unclip the molded surround (4) from the cradle (2) and then carefully pull the **CAMCO** badge (5) out of the four fastening holes with both hands. Remove the foam filter (3) and clean it with a mild dishwashing detergent and warm water. Once dry, replace the foam filter carefully into the cradle and repeat the dismantling procedure in reverse. Insert the five pins on the filter frame into the clip apertures (1) and slide the filter carefully to the right to secure.

V8 Filter Assembly

- 1 Clip Aperture
- 2 Injection Molded Cradle
- 3 Foam Filter
- 4 Injection Molded Surround
- 5 Injection Molded **CAMCO** Badge





5 SPECIFICATION

Output Power 1 kHz, THD \leq 1%, in dual channel operation <small>Duration limited by fuse / thermal protection for RL < 8 Ω in dual channel operation or RL < 16 Ω in mono bridge operation measurement at 2 Ω without preconditioning (EN 60268-3)</small>	???? W @ 16 Ω 2200 W @ 8 Ω 3800 W @ 4 Ω 4000 W @ 2 Ω 4400 W @ 4 Ω Peak 4400 W @ 2 Ω Peak
1 kHz, THD \leq 1%, in mono bridge operation	4400 W @ 16 Ω 7600 W @ 8 Ω 8000 W @ 4 Ω 7600 W @ 2 Ω 8000 W @ 1 Ω 8800 W @ 4 Ω Peak 8800 W @ 2 Ω Peak
Circuitry	Hybrid Class H
Signal to Noise-Ratio <small>20 Hz - 20 kHz, 8 Ω load</small>	> 107 dB (unweighted) > 110 dB (A-weighted)
Power consumption @ 230 V <small>(both channels driven)</small>	tba.



5 SPECIFICATION

Frequency Response 8 Ω , 1 dB below rated power	20 Hz - 20 kHz \pm 0,15 dB
Input Impedance	22 k Ω balanced
Input Gain	selectable: 26 dB, 32 dB or 1,4 V input sensitivity
Protection Circuits	inrush-current limitation, protection circuits against power on/off transients, temperature monitoring fo transformers and heatsinks, output DC protection, temperature dependent SOA protection, intelligent mains fuse protection
Limiter	clip limiter
Fan	two temperature dependent speed-controlled axial fans
LED Indicators	LEDs for Input Selection, Output Mode, Clip, Signal, Device Identify, DSP, and <u>Uman</u>
Input Connectors	3-pin XLR, male and female per channel, pin 2 = hot (inphase) <u>Uman</u> network connectors (In and out) Ethernet Link
Output Connectors	One 4-pole SPEAKON connector for each output channel (bi-amping possilbe)
Modes of Operation	dual channel, mono bridge and parallel mono
Options	Plug-in DSP card available
THD+N (typical) 20 Hz - 20 kHz, 8 Ω load, 3 dB below rated power	<0,01%
SMPTE (typical) 20 Hz - 20 kHz, 8 Ω load, 3 dB below rated power	<0,01%
Damping Factor 8 Ω load, 1 kHz and below	>400
Dimensions (WxHxD)	483x88,1x452,5 mm / 19x3,5x17,2 inches (19", 2U)
Net Weight	13 kg / 28,7 lbs
Shipping Dimensions (WxHxD)	615x135x540 mm (0,045 m3) / 21,3x5,3x24,2 inches
Shipping Weight	15,6 kg / 34,4 lbs

We reserve the right to make technical alterations without prior notice



CAMCO

VORTEX
SILVER SERIES

6 TYPICAL PERFORMANCE DIAGRAMS

6 Typical Performance Diagrams
tba.



7.1 Summary of Warranty

CAMCO guarantees the **V8** Amplifier to be free from defective material and/or workmanship for a period of six (6) years from the date of sale. When a defect occurs under normal installation and use, **CAMCO** will repair the product under this warranty. In this event, please return the amplifier to your dealer/distributor together with a copy of your sales receipt as proof of purchase.

This warranty provides that examination of the returned product must indicate in our judgement a manufacturing defect.

7.2 Items Excluded from This Warranty

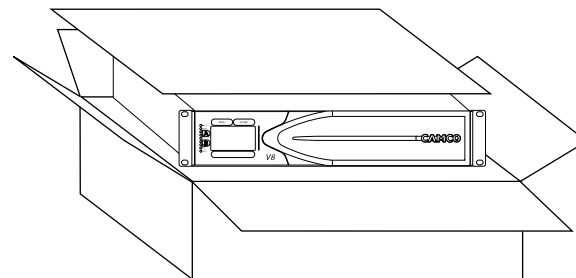
CAMCO is not liable for any damage caused by shipping accidents, misuse, abuse, operation with incorrect AC voltage, operation with faulty peripheral equipment, modification or alteration without prior factory approval, service by an unauthorized service center and normal wear and tear. Amplifiers on which the serial number has been removed or defaced are not eligible for warranty service.

7.3 What **CAMCO** Will Do

CAMCO (or its appointed agent) undertakes to rectify any defect regardless of the reason for failure (unless excluded from this warranty), by repair, replacement or refund as it sees fit.

7.4 How to Obtain Warranty Service

You must notify your dealer/distributor of your need for warranty service. All components must be shipped in the original packaging.



7.5 **CAMCO**'s Product Improvement

CAMCO reserves the right to improve the technical standard of its products without giving prior notice. If in any doubt, please consult your dealer/distributor or contact **CAMCO** directly for clarification.



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8 SERVICE INFORMATION

**PLEASE ENCLOSE THIS COMPLETED FORM WITH THE AMPLIFIER
DO NOT SEND SEPARATELY**

Owner's Information

Company Name: _____

Contact: _____

Address: _____

Telephone: _____

Facsimile: _____

eMail Address: _____

Model: _____

Serial Number: _____

Purchase Date: _____

Nature of problem occurred

Please describe the conditions that existed when the problem occurred and what attempts were made to correct it:

Expired Warranty

If the warranty has expired, payment will be:

☐ Cash/Cheque

☐ VISA

☐ MasterCard

Other equipment in your system: _____

Shipping Address

To transport the amplifier, the original packing materials must be used.

Please return the amplifier to the following address or your nearest

CAMCO appointed distributor.

Our web site: **www.camcoaudio.com** provides a complete list of **CAMCO** dealers/distributors.

CAMCO Produktions- und Vertriebs-GmbH für Beschallungs- und Beleuchtungsanlagen, Fischpicke 5, D-57482 Wenden, Germany



9 Maintenance Information

Cleaning and servicing the inside of the amplifier must never be carried out by unqualified personnel. The amplifier must never be opened by unqualified personnel.

Cleaning and servicing work on the inside of the amplifier must only be carried out by qualified personnel.

Qualified personnel is defined as a person who has gained specialised relevant knowledge of electronic engineering through education, training, and experience, and who has sufficient knowledge of all relevant governmental work safety regulations to be in a position to judge the safe functioning of power amplifiers based on technical rules according to IEC 60065 (IEC 60065 (DIN EN 60065) "Safety Requirements for Audio, Video or similar Electronic Appliances").

In order to guarantee the safe functioning of the amplifier, it has to be checked regularly, depending on its application but at least once a year, by a properly qualified person.

Advice on how to carry out these checks can be found in DIN VDE 0702-1 "Safety Checks for Electronic Appliances" .

An amplifier that is considered to be unsafe must be labelled accordingly and stored in a safe place to prevent this amplifier being used mistakenly.

10 Decommissioning

During the decommissioning process of the amplifier, all legally prescribed rules and procedures must be adhered to.



CAMCO

VORTEX
SILVER SERIES

COMPANY INFORMATION

Mailing Address:

CAMCO Produktions- und Vertriebs-GmbH
für Beschallungs- und Beleuchtungsanlagen
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Facsimile:

+49 (0) 2762 408-10

Internet:

www.camcoaudio.com

Email:

postmaster@camcoaudio.com



VORTEX
SILVER SERIES

NOTICES/CHANGES MADE TO THE AMPLIFIER

Changes Made To The Amplifier

NOTE / IMPORTANT:

Please consider that any changes made to the amplifier have to be documented in writing and passed on to the buyer in the event of resale!

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